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7590

10/05/2004

M. Reid Russell  
1240 East 100 South, # 10  
St. George, UT 84790

EXAMINER
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RIDLEY, BASIA ANNA

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/893,124

Applicant(s)

STEINKE, RICHARD A.

Examiner

Basia Ridley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-12, drawn to an apparatus, classified in class 422, subclass 172.
  - II. Claims 13-22, drawn to a method, classified in class 423, subclass 244.07.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by hand.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.
5. Applicant's election without traverse of Group I, claims 1-12 in a preliminary amendment filed on 26 June 2001 is acknowledged. Claims 13-22 were cancelled in said Paper.

### ***Priority***

6. Acknowledgment is made of applicant's claim for domestic priority under 35 U.S.C. 120. The specification should be amended to include current status of all referenced nonprovisional parent applications.

***Information Disclosure Statement***

7. Applicant's request that references cited in the parent application be transferred to the present CIP application fails to comply with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office. Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

***Specification***

8. The title of the invention is not descriptive as it encompasses both, the elected and non-elected, inventions. A new title is required that is clearly indicative of the invention to which the claims are directed.

9. The disclosure is objected to because of the following informalities:

- P2/L16, "SO<sub>2</sub> ;" should be replaced with --SO<sub>2</sub>--;
- P2/L17, "SO<sub>2</sub>," should be replaced with --SO<sub>2</sub>--;
- P9/L1, "Which pollutants" should be replaced with --Said pollutants--;
- P9/L2, "invention. show herein" should be corrected;
- P11/L2, "preferably" should be replaced with --preferably--;
- P11/L8, "to impact and (...) mixed" should be replaced with --to impact and (...)mix--;
- throughout the specification reference number D is used to indicate, both, an arrow indicating gas flow and a traveling distance;
- P15/L12. "arrow F" should be replaced with --arrow E--;
- P17/L9. "arrow B" should be replaced with --arrow D--;

Appropriate correction is required.

***Drawings***

10. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference

character "D" has been used to designate, both, an arrow indicating gas flow and a traveling distance (see Fig. 1 and 2).

11. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "28" has been used to designate, both, water reservoir (Fig. 2) and a feature not described in specification (Fig. 3).

12. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

#### ***Claim Objections***

13. Claims 1-12 are objected to because of the following informalities:

- claim 1, line 3 recites "between said at a first end", suggested correction is --between said first end --;
- claim 1, line 4 recites "said duct having a length and has a sorbent material injector means", suggested correction is --said duct having a length and having a sorbent material injector means--;
- claim 8, line 2 recites "limestone..", suggested correction is --limestone.--;
- claim 11, line 3 recites "flue gas steam flow", suggested correction is --flue gas stream flow--.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 1-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy et al. (USP 5,084,256) in view of Yoon (USP 4,604,269).

Regarding claims 1-4, McElroy et al., in Fig. 5, discloses a similar apparatus for removing particulate matter and gaseous pollutants from a gas stream, the apparatus comprising:

- a duct (14) having a gas inlet first end connected to receive a gas stream containing pollutant particles;
- said duct (14) defining a passageway between said first end and a second end (18) that connects to vent particulates into a particulate removal means (PARTICULATE CONTROL);
- said duct having a length and having a sorbent material injector means (22) fitted into a duct side at a sorbent introduction site, with said sorbent material injector means having a nozzle end that is to pass particles of a sorbent material into the duct (14), and counter-current to, a flue gas flow, passing through said duct that contains pollutant particles, providing mixed and compacted sorbent material and pollutant particles (Fig. 5);
- moisture injector means (24) fitted into said duct spaced from said sorbent material injector means nozzle end for injecting water, as a fine mist, into said gas stream containing said mixed and compacted sorbent material and pollutant particles, which said moisture injector means is connected to a source of water, and which said moisture is injected into said mixed and compacted sorbent material and pollutant particles prior to its passage into a removal means (Fig. 1);
- removal means (PARTICULATE CONTROL) or removing said mixed and compacted sorbent

material and pollutant particles.

While the reference does not explicitly disclose said sorbent material injector means having a nozzle end located within the duct, said feature is inherent in the apparatus of McElroy et al.

While McElroy et al. does not explicitly disclose a sensor means installed in said duct downstream from said injector means nozzle end to read moisture content of the gas stream containing mixed compacted pollutants and sorbent material particles and to control the operation of the moisture injector means to maintain a suitable moisture level, the reference does disclose maintaining said gas stream at specific moisture level (C6/L23-33). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a moisture sensor as means providing feedback necessary to maintain said gas stream at specific moisture level required by McElroy et al. Doing so would amount to nothing more than a use of a known apparatus for its intended use in a known environment to accomplish entirely expected result.

While the reference does not explicitly disclose the distance between the moisture injector means and said sorbent material injector means nozzle end, as instant specification is silent to unexpected results, it would have been obvious to adjust said distance, to any desired distance based on particular system requirements, since such modifications would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955).

McElroy et al. does not explicitly disclose the moisture content of the gas stream containing mixed and compacted pollutant and sorbent particles being maintained from 18 to 20 percent of saturation. But, as specific moisture percent does not impart any further structural limitations on the claimed apparatus, and, as speed and effectiveness of reaction of sorbent with SO<sub>2</sub> in gas stream is a variable that can be controlled by adjusting the moisture content of said gas stream (as evidenced by

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McElroy et al., C6/L23-33), and further as instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine optimum moisture content, including moistures from 18 to 20 percent, in said gas stream of McElroy et al., for the purpose of providing optimum reaction conditions for sorbent with SO<sub>2</sub> in gas stream.

While McElroy et al. does not explicitly disclose the apparatus wherein said duct (14) defines a straight passageway between said first end and a second end, it was well known in the art at the time of the invention that ducts can have a variety of shapes of configurations, including one forming a straight passageway (as evidenced by Yoon (see Drawing Figure)). ). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the duct of McElroy et al. to define a straight passageway between said first end and a second end, as taught by Yoon, since it has been held that the change in configuration of shape of a device is obvious absent persuasive evidence that the particular configuration is significant. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). An ordinary skilled artisan would have been motivated to do the foregoing in order to simplify the manufacturing process of said duct.

Regarding claim 5, McElroy et al. in view of Yoon disclose all claim limitations as set forth above. But, while McElroy et al. discloses the injector means injecting a mist of fine water droplets in to said duct (C6/L23-33), the reference does not explicitly disclose said water droplets having size of from 10 to 15 microns. But, as specific water droplet size does not impart any further structural limitations on the claimed apparatus, and, as effectiveness of mixing is a variable that can be controlled by adjusting the size of components being mixed, and further as instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine optimum water droplet size, including sizes from 10 to 15 microns,



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in said gas stream of McElroy et al., for the purpose of providing optimum mixing of water with stream components.

Regarding claim 6, McElroy et al. in view of Yoon disclose all claim limitations as set forth above. Additionally McElroy et al. discloses the apparatus wherein said removal means is a bag house system connected by a vent to the second end of the duct passageway, and said bag house includes a plurality of bags having open ends therethrough the mixed and compacted sorbent material and pollutant particles are directed, and each bag is formed from a bag material having pores that each function as a site for receiving the mixed and compacted sorbent material and pollutant particles (Fig. 5 and C2/L27-44).

Regarding claim 8, McElroy et al. in view of Yoon disclose all claim limitations as set forth above. Further, McElroy et al. discloses the apparatus wherein said sorbent material is a hydrated lime, quick lime or limestone (Fig. 5).

Regarding claims 9-10, McElroy et al. in view of Yoon disclose all claim limitations as set forth above. While McElroy et al. does not disclose gas flow pressure and temperature sensor means located in the duct upstream from the sorbent material injector means and connected to control operation of the sorbent material injector means to increase or decrease sorbent material volume of flow and pressure, and to control operation of a valve that is opened on command of gas flow pressure and temperature sensor means to pass moisture flow into said sorbent material injector means.

Yoon teaches an apparatus wherein the flow of absorbent is controlled based on composition of flue gas to be purified (C4/L21-33) and the amount of moisture flow to the solvent is controlled based on the flow of absorbent (C3/L47-C4/L2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to control both, the flow of sorbent and the amount of moisture flow into the sorbent, as taught

by Yoon, in the apparatus of McElroy et al., for the purpose of obtaining desired degree of sulfur removal.

Even though Yoon does not, explicitly, disclose a gas flow pressure and temperature sensor means installed in said duct upstream from the delivery means to control the operation of the delivery means to increase or decrease sorbent material volume of flow, and to control operation of a valve that is opened on command of gas flow pressure and temperature sensor means to pass moisture flow into said delivery means, the reference does disclose maintaining said flow of absorbent based on composition of flue gas to be purified (C4/L21-33) and maintaining the amount of moisture flow based on the flow of absorbent (C3/L47-C4/L2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use flow pressure and temperature sensor as means providing feedback necessary to control said flows, as disclosed by McElroy et al. in view of Yoon.

Regarding limitations recited in claims 1-6 and 8-10 which are directed to a manner of operating disclosed apparatus, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

16. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy et al. (USP 5,084,256) in view of Yoon (USP 4,604,269), as applied to claim 1 above, and further in view of Dilworth (USP 4,277,450).

Regarding claim 7, McElroy et al. in view of Yoon disclose all claim limitations as set forth above, but the references do not explicitly disclose the sorbent material being ground to a fine

consistency of from 150 to 350 mesh. But, as specific sorbent consistency does not impart any further structural limitations on the claimed apparatus, and, as sorbent surface area and its sorption capacity are variables that can be controlled by adjusting the sorbent consistency (as evidenced by Dilworth, C6/L30-52), and further as instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine optimum sorbent consistency, including fine consistencies from 150 to 350 mesh, in said apparatus of McElroy et al., for the purpose of providing increased sorbent surface area and optimum sorption capacity.

Regarding limitations recited in claim 7 which are directed to a manner of operating disclosed apparatus, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

17. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy et al. (USP 5,084,256) in view of Yoon (USP 4,604,269), as applied to claim 1 above, and further in view of Lerner (USP 4,795,619).

Regarding claim 11, McElroy et al. in view of Yoon disclose all claim limitations as set forth above. But, while McElroy et al. discloses the concept that mixing of the sorbent in the gas stream has high impact on sorbent utilization (C5/L49-58), the reference does not disclose at least one static fin or plate secured along a coupling edge thereof to a duct inner wall to assist in said mixing.

Lerner teaches an apparatus comprising at least one static fin or plate (C6/L20-28).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide at least one static fin or plate secured along a coupling edge thereof to a duct inner wall, as taught by Lerner, in the apparatus of McElroy et al. in view of Yoon, for the purpose of securing good distribution of the sorbent in the gas stream.

While Lerner does not disclose any specific examples of said at least one static fin or plate, as the instant specification is silent to unexpected results, and as static fins or plates secured along a coupling edge thereof to a duct inner wall, extending therefrom toward said duct longitudinal center axis, and slanting with the direction of gas stream flow at an angle from said duct inner wall that is less than 90 degrees are well known in the art, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use said secured along a coupling edge thereof to a duct inner wall, extending therefrom toward said duct longitudinal center axis, and slanting with the direction of gas stream flow at an angle from said duct inner wall that is less than 90 degrees as said at least one static fin or plate of Lerner.

Regarding limitations recited in claim 11 which are directed to a manner of operating disclosed apparatus, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

18. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy et al. (USP 5,084,256) in view of Yoon (USP 4,604,269), as applied to claim 1 above, and further in view of Woodroffe et al. (USP 4,922,840).

Regarding claim 12, McElroy et al. in view of Yoon disclose all claim limitations as set forth above. But, while McElroy et al. discloses the delivery means including an injector straight tube fitted through the duct against the direction of gas stream flow and is to pass the fine sorbent material particles under pressure (C5/L49-58) said sorbent material particles flow being counter-current to said gas stream (Fig. 5), the reference does not disclose said injector straight tube fitted through the duct at an angle of from 30 to 60 degrees to the duct interior wall against the direction of gas stream flow.

Woodroffe et al., in Fig. 3, teaches an apparatus, wherein sorbent nozzle is an injector straight tube (26) fitted through the duct at an angle less than 90 degrees to the duct interior wall against the direction of gas stream flow, for the purpose of providing adequate residence or flight time and to promote mixing between the hot gas and sorbent particles (C7/L13-24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an injector straight tube fitted through the duct at an angle less than 90 degrees to the duct interior wall against the direction of gas stream flow, as taught by Woodroffe et al., in the apparatus of McElroy et al. in view of Yoon, for the purpose of providing adequate residence or flight time and to promote mixing between the hot gas and sorbent particles.

While Woodroffe et al. does not explicitly disclose said angle being from thirty to sixty degrees to the duct interior wall it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust said angle to ensure adequate residence or flight time and to promote mixing between the hot gas and sorbent particles, as required by Woodroffe et al., since it has been held that the change in configuration of shape of a device is obvious absent persuasive evidence that the particular configuration is significant. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding limitations recited in claim 12 which are directed to a manner of operating disclosed apparatus, neither the manner of operating a disclosed device nor material or article worked upon

further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

***Conclusion***

19. In view of the foregoing, none of the claims are allowed.
20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).



Basia Ridley  
Examiner  
Art Unit 1764

BR  
October 1, 2004